Practice worksheet | Rates of change and differential equations

Exponential and logistic models

Name: _____ Date: _____

6 questions | 12 marks

1. An amount decays with half-life 5 hours and starts at 80 g. Find the exponential model. [2 marks]

2. $N = 120e^{0.08t}$, t in days. Find the time to reach 300. [2 marks]

3. For $P' = 0.3P(1 - \frac{P}{800})$ and $P(0) = 100$, find $P(t)$. [2 marks]

4. For the preceding logistic model, find the maximum growth rate. [2 marks]

5. $P = \frac{500}{1 + 9e^{-0.2t}}$. Find the initial amount and long-term limit. [2 marks]

6. Under $P' = 0.4P(1 - \frac{P}{1000})$, state the predicted direction of change at $P = 1200$. [2 marks]